REMARKS

This paper is in response to the Official Action mailed December 15, 2004.

Claims 1-5, 7-32 and 47-48 stand rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. The Examiner alleges that the claims are directed to making magnetic iron oxide and ferrite nanoparticles, but no iron oxide or ferrite is used during any steps of the claimed invention. In response to the Examiner's rejection, Applicant has amended claim 1. Applicant has also amended claim 3, added claims 49 and 50, and canceled claims 16, 19, 20, 47 and 48 to expedite the prosecution of this application. No new matter has been added by way of amendment; thus, entry of the amendment is respectfully requested.

Claims 47-48 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,133,047 to Elaissari et al. ("*Elaissari*"). The above noted cancellation of claims 47 and 48 obviates this rejection.

Claims 1-5, 7-32 and 47-48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,783,336 to Margel ("*Margel*"). The Examiner alleges that *Margel* discloses methods of preparing a coated acrolein type in nanometer sizes comprising mixing an aqueous solution of acrolein with an aqueous dispersion of Fe_3O_4 in the presence of an oxidizing agent at pH values above 7 to form magnetic particles of uniform size, and the particles are cross-linked to various bioactive agents such as immunoglobulin or fluorescent dyes for various utilities. However, the process of *Margel* does not even produce monodispersed nanoparticles coated with magnetic metal oxide, much less teach the claimed method. Therefore, Applicant respectfully traverses this rejection.

Margel discloses methods of preparing polyacrolein microspheres, and does not generally relate to preparing nanoparticles coated with magnetic metal oxides. The product produced by *Margel* is a homogenous particle made of polyacrolein, which is eventually mixed with Fe_3O_4. To the contrary, the claimed process provides a composite particle with a polymeric core and a magnetic metal oxide coating thereon.

The Examiner contends that the method of Margel employs polymerizing acrolein to form anionic polyacrolein microspheres at pH of about 13, and that these polymers are within the scope of the instant claims because they are anionic and contain hydroxyl, carboxyl, ether groups. The examples of *Margel* merely disclose that a magnetic particle can be produced. However, there is no disclosure in *Margel* that the particles are monodispersed nanoparticles coated with a magnetic metal oxide, as required by claim 1. As stated above, the product produced by the process of *Margel* is a homogenous particle made of polyacrolein, with a high aldehyde content. Indeed, none of the excerpts quoted by the Examiner disclose otherwise.

The Examiner has taken the position that the polymers of *Margel* are within the scope of the instant claims because they are anionic and contain hydroxyl, carboxyl, ether groups, and that *Margel* states that anionic polymers such as polyvinylpyridine may be coated in the same manner as the polyacrolein beads. First, the anionic polyacrolein microspheres that were coated with the radial microspheres are described as being "relatively large anionic microspheres... e.g. 2.0 micron anionic beads." (*Margel*, col. 3, lns. 40-46.) This is much larger than the magnetic microparticles of the present invention, which are of sizes less than 0.3µm. It is impermissible to consider only a fragment of a reference to support a given position, while ignoring the other parts that are necessary to the full appreciation of what such reference

fairly suggests to one of ordinary skill in the art. *In re Hedges*, 228 USPQ 685, 687 (1986). Second, the anionic polyacrolein microspheres are anionic because of the use of an anionic surfactant (see *Margel*, col. 3, lns. 8-12), and not due to its polymeric structure. Moreover, the polyvinylpyridine microspheres, which are cationic, are bound electrostatically to the polyacrolein microsphere, which has been made anionic by the surfactant. Certainly, this does not constitute a nanoparticle coated with a magnetic metal oxide, thus *Margel* cannot anticipate claim 1 of the present invention.

Likewise, *Margel* does not teach the use of a soluble chelating polymer for building monodispersed magnetic particles in amounts which do not exceed substantially the binding capacity of the chelating agent. This parameter is significant, as explained on page 14 of the instant specification, and ensures that substantially all the nuclei are formed before a significant growth of the magnetic coating starts, in order to obtain a high yield of a single population of uniform monodispersed magnetic nanoparticles.

Furthermore, the Examiner has taken the position that the formation addition of ferrofluidic solution over a 12 hour period of *Margel* meets the claim limitation of successively repeating the steps of claim 1. A reaction continuing for 12 hours is not the same as successively repeating steps d) to f) of claim 1, which include introducing into the solution a second amount of metal salts, causing the second amount of metal ions to be present in the oxidation states required for the formation of the oxide which is magnetic, and maintaining the pH of the solution at the range of at least 7. In *Margel*, the reaction continues under constant conditions; there is no disclosure that additional metal ions are added or the pH level is adjusted.

Since claim 1 is the base claim of the remaining claims at issue, *Margel* cannot anticipate claims 1-5, 7-15, 17-

18, 21-32 and 49-50 for the reasons stated above. Reconsideration and withdrawal of this rejection is respectfully requested.

For the sake of completeness, Applicant notes that the Examiner has specifically stated that Margel uses a nitrate salt oxidizing agent such as persulfate-silver-nitrate which meets the limitations of claims 12-15, and a basic surfactant or solution to maintain a high pH during microsphere formation which meets the limitations of claims 17 and 18. Irrespective of the omissions of *Margel* discussed above, *Margel* would not anticipate these claims for the additional following reasons. With regard to claims 12-15, *Margel* discloses that the persulfate-silver-nitrate is an oxidizer needed for radical polymerization of acrolein (see Margel, col. 2, lns. 51-56), and not for oxidizing ferrous salt, as in the instant invention. In the process of *Margel*, iron is either absent or is present at the desired oxidation state, as Fe_3O_4, from the beginning (see *Margel*, Example 20). Claim 17 requires that the pH is maintained in the range of at least 7 by the addition of a base, however, the pH's disclosed in *Margel* at column 3, lines 25-35 and column 4, lines 40-51, cited by the Examiner, are much higher than 7 because such a pH is needed for polymerization. In the instant case, the basic pH is needed for oxide formation. Claim 18 requires that the pH is maintained at a constant value in the range between 8 to 10. In *Margel*, pH's of between 11.5-13 and 10.5 are disclosed in the sections cited by the Examiner; these values are clearly outside the claimed range.

Claims 1-5, 7-32 and 47-48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Elaissari* in view of U.S. Patent No. 5,213,895 to Hirai ("*Hirai*"). *Elaissari* discloses a process for obtaining particles comprising the steps of polymerizing a first polymer to provide a particle core, polymerizing a second polymer to adsorb a magnetic material,

bringing a magnetic material into contact with the two polymers at a temperature below the lower critical solubility temperature to be adsorbed on the second polymer, increasing the temperature above the lower critical solubility temperature to obtain a magnetic layer and adding a monomer and polymerizing a third polymer to make an encapsulating outer layer. Not one of the steps of claim 1, *i.e.*, providing a chelating polymer, contacting the polymer with ferrous ions in amounts not exceeding the chelating capacity, oxidizing the ferrous ions, adjusting the pH to at least 7, adding another portion of metal ions, and optionally repeating the last three steps are disclosed by *Elaissari*. Indeed, the differences between the method of *Elaissari* and the method of claim 1 of the instant application are underscored by the resulting particles. The particles produced by the method of *Elaissari* consist of a non-magnetic core and two outer polymer layers. In contrast, the particles produced by the method of the present invention have a magnetic core and an inorganic coat.

Furthermore, there is no teaching, suggestion or motivation to combine the process for preparing magnetic paticles of *Elaissari*, with the process of *Hirai*, which provides a new catalytic material. Moreover, even if a person skilled in the art had been motivated to combine these references, the claimed invention would not be produced. *Hirai* does not teach any of the steps of claim 1. *Hirai* discloses a method for producing particles adsorbed on a solid carrier, and the preparation of the particles includes the steps of obtaining colloidal dispersion of metal or metal compounds, adding polyvinylpyrrolidone to provide a protective polymer to the metal or metal compound, and combining the protected particles with silica gel. Indeed, the only mention of magnetite in Hirai is found in Example 11, which teaches converting iron to magnetite for the purpose of mixing it with the protective

polymer. There is no chelating step, there are no changes in the pH or redox potential in the mixture of the polymer and iron, and there is no incremental building of an inorganic outer magnetic layer. Furthermore, Example 11 does not teach contacting ferrous ions with a polymer.

Additionally, neither *Elaissari* nor *Hirai* disclose the use of a soluble chelating polymer for building monodispersed magnetic particles in amounts which do not exceed substantially the binding capacity of the chelating agent, as stated above. In light of the foregoing reasons, claim 1 is not obvious over *Elaissari* in view of *Hirai*. Since claim 1 is the base claim of the remaining claims at issue, the combination of *Elaissari* and *Hirai* not render claims 1-5, 7-15, 17-18, 21-32 and 49-50 obvious for the reasons stated above. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

As it is believed that all of the rejections set forth in the Official Action have been fully met, favorable reconsideration and allowance are earnestly solicited.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he/she telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

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Respectfully submitted,

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